Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently amended) Apparatus for imaging the internal structure of a volume exhibiting an internal variation, comprising:

a source of penetrating radiation and a two dimensional detector for the radiation, the source and the detector being arranged to produce a series of projected images of the volume;

a selection means for selecting images with similar phase from the series of projected images; and

a reconstruction means for deriving information as to the three dimensional structure in the volume from the selected images;

wherein the selection means is arranged to:

collapse the images derived from the series from two dimensions to one dimension by summing the intensities of pixels along a dimension transverse to the one dimension,

produce a further image from a composite of the one-dimensional images obtained from images in the series,

analyze the further image for patterns, and

select from the series images having like phase in that pattern.

2. (Currently amended) Apparatus according to claim 1 in which the source and the detector are rotatable relative to the volume, such that the series of projected images show the volume in different orientations.

3. (Original) Apparatus according to claim 1 in which the variation is periodic.

4. (Original) Apparatus according to claim 1 in which the images are pre-processed prior to operation of the selection means.

5. (Original) Apparatus according to claim 4 in which the pre-processing includes filters for narrowing the range of intensities in the image.

6. (Original) Apparatus according to claim 4 in which the pre-processing includes derivative filters to highlight edges in the image.

7. (Currently amended) Apparatus according to claim 6 in which the volume contains a patient and the derivative is carried out in the direction of a craniocordal axis of a patient.

8. (Original) Apparatus according claim 4 in which the pre-processing includes a mask applied to the image to select areas including edges.

9. (Currently amended) Apparatus according to claim 8 in which the mask is derived from a threshold applied to the image as filtered via a derivative filter.

10. (Original) Apparatus according to claim 4 in which the pre-processing includes an application of a mask to exclude areas of the image that are external to an object within the volume.

11. (Original) Apparatus according to claim 1 in which a plurality of reconstructions are derived from a plurality of subsets each containing phase-correlated images from the series, the phase correlation of each subset differing from the phase correlation of other subsets.

12. (Original) Apparatus according to claim 1 in which the analysis for periodic patterns in the further image includes a step of comparison of the one-dimensional images therein to identify a movement of features in that dimension.

13. (Original) Apparatus according to claim 12 in which adjacent images are compared.

14. (Original) Apparatus according to claim 12 in which the one-dimensional images are compared by calculating the difference in intensity between the images at different relative shifts of the images.

15. (Original) Apparatus according to claim 14 in which the rms difference is compared.

16. (Original) Apparatus according to claim 1 in which the further image is subjected to processing prior to analysis for periodic patterns.

17. (Original) Apparatus according to claim 16 in which the pre-processing includes derivative filters to highlight edges in the further image.

18. (Original) Apparatus according to claim 17 in which the derivative is carried out in a direction transverse to the one dimension.

19. (Original) Apparatus according to claim 16 in which the pre-processing includes the selection of a region of interest in the further image and the exclusion of other areas from further processing.

20. (Original) Apparatus according to claim 19 in which the region of interest is selected by analysis of the area containing the highest derivatives.

21. (Original) Apparatus according to claim 1 in which the variation is a natural variation exhibited by living organism.

22. (Original) Apparatus according to claim 21 in which the variation is caused by breathing.

23. (Currently amended) A method of selecting phase correlated images from the output of a scanner, comprising the steps of, for each of a plurality of images in a series thereof produced by the scanner:

collapsing the images from two dimensions to one dimension by summing the intensities of pixels along a dimension transverse to the one dimension,

producing a further image from a composite of the one-dimensional images obtained from images in the series,

analyzing the further image for periodic patterns, and

selecting from the series images having like phase in that periodic pattern.

24. (Original) A method according to claim 23 in which the scanner is a cone beam CT scanner.

25. (Original) A method according to claim 24 in which the images are of a breathing patient.

26. (Currently amended) A computer readable medium containing a computer program product for selecting phase correlated images from the output of a scanner, the computer program product comprising:

program code for executing the steps of, for each of a plurality of images in a series thereof produced by the scanner:

collapsing the images from two dimensions to one dimension by summing the intensities of pixels along a dimension transverse to the one dimension,

producing a further image from a composite of the one-dimensional images

obtained from images in the series,

analyzing the further image for periodic patterns, and

selecting from the series images having like phase in that periodic pattern.

27. (Currently amended) A computer readable medium containing a computer program product according to claim 26 in which the scanner is a cone beam CT scanner.

28. (Currently amended) A computer readable medium containing a computer program product according to claim 27 in which the images are of a breathing patient.